



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
Change of: Point of Withdrawal
WRTS File # CS4-069703CL@2

PRIORITY DATE	CLAIM NO.	PERMIT NO.	CERTIFICATE NO.
October 19, 1903	069703		

NAME		
Betty Tyler		
ADDRESS/STREET	CITY/STATE	ZIP CODE
5682 Dinkleman Canyon Road	Entiat, WA	98822

PUBLIC WATERS TO BE APPROPRIATED

SOURCE		
A Well		
TRIBUTARY OF (IF SURFACE WATERS)		
N/A		
MAXIMUM CUBIC FEET PER SECOND (cfs)	MAXIMUM GALLONS PER MINUTE (gpm)	MAXIMUM ACRE FEET PER YEAR (ac-ft/yr)
	7	2.8

QUANTITY, TYPE OF USE, PERIOD OF USE
7 gallons per minute, 2.6 acre-feet per year, from April 1 to October 31 for the irrigation of 0.7 acres

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF WITHDRAWAL
550 feet North and 1,090 feet West of the Southeast corner of Section 10, T. 25 N., R. 20 E.W.M.

SOURCE	PARCEL	LATITUDE	LONGITUDE	QTR/QTR	SECTION	TOWNSHIP	RANGE
Well	252010440100	47.67289	-120.30996	SE¼SE¼	10	25 N.	20 E.W.M.

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

[Attachment 1 shows location of the authorized place of use and point(s) of diversion or withdrawal]

That portion of the Southeast quarter of the Southeast quarter of Section 10, Township 25 North, Range 20 E.W. M. described as follows: Beginning at the Southeast corner of said section, thence West 1,320 feet to the quarter quarter corner of said section; thence North 193 feet; thence North 53° East 254 feet; thence North 49½° East for 348 feet, more or less, to an iron stake on the Southwesterly bank of the Entiat River and the true point of the beginning of this description; thence retrace the last course of 180 feet to an iron stake; thence turn 90° right and run 235 feet to an iron stake; thence turn 90° right and run 144 feet to an iron stake on the Southwesterly bank of the Entiat River, thence Southeasterly along the Southwesterly bank of said river 240 feet, more or less, to the point of beginning (Chelan Co. Parcel No. 252010440100).

DESCRIPTION OF PROPOSED WORKS

A four-inch diameter well completed to 53 feet with a one horsepower Berkeley submersible pump connected to a two-inch mainline with a SeaMatrics full pipe magnetic AG-2000 meter. Impact sprinklers and handlines are used to irrigate the property.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE	COMPLETE PROJECT BY THIS DATE	WATER PUT TO FULL USE BY THIS DATE
Begun	April 1, 2010	October 31, 2011

1. Well, Well Logs, and Well Construction Standards

- 1.1. In accordance with chapter 173-160 WAC, wells shall not be located within certain minimum distances of potential sources of contamination. These minimum distances shall comply with local health regulations, as appropriate. In general, wells shall be located at least 100 feet from sources of contamination. Wells shall not be located within 1,000 feet of the boundary of a solid waste landfill.
- 1.2. All wells constructed in the state shall meet the construction requirements of chapter 173-160 WAC titled "Minimum Standards for the Construction and Maintenance of Wells" and chapter 18.104 RCW titled "Water Well Construction". Any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety, or public health hazard shall be decommissioned.
- 1.3. All wells shall be tagged with a Department of Ecology (Ecology) unique well identification number. If you have an existing well and it does not have a tag, please contact the well-drilling coordinator at the regional Ecology office issuing this decision. This tag shall remain attached to the well. If you are required to submit water measuring reports, reference this tag number.
- 1.4. Required installation and maintenance of an access port as described in WAC 173-160-291(3).

2. Measurements, Monitoring, Metering, and Reporting

- 2.1. An approved measuring device shall be installed and maintained for each of the sources authorized by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", chapter 173-173 WAC. <http://www.ecy.wa.gov/programs/wr/measuring/measuringhome.html>
- 2.2. Water use data shall be recorded weekly and maintained by the property owner for a minimum of five years. The maximum rate of diversion/withdrawal and the annual total volume shall be submitted to Ecology by January 31st of each calendar year.
- 2.3. Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation, and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements". <http://www.ecy.wa.gov/programs/wr/measuring/measuringhome.html>

3. Schedule and Inspections

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times to the project location and to inspect at reasonable times records of water use, wells, diversions, measuring devices, and associated distribution systems for compliance with water law.

4. Project Completion

The water right holder shall file the notice of project completion when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The *Certificate of Change* will reflect the extent of beneficial use within the limitations of the change authorization. Elements of the project completion inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and compliance with provisions.

5. Water Use Efficiency

Use of water under this authorization shall be contingent upon the water right holder's maintenance of efficient water delivery systems and use of up-to-date water conservation practices consistent with established regulation requirements and facility capabilities.

6. Non-Additive to Confirmed Claims

The water use authorized under this filing shall be considered non-additive to any water rights confirmed for said claim as a result of a general adjudication through Superior Court, should adjudication be undertaken.

FINDINGS OF FACT AND ORDER

Upon reviewing the investigator's report, I find all facts relevant and material to the subject application have been thoroughly investigated. Furthermore, I find the change of water right as recommended will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER approval of the recommended change to a point of withdrawal under Change Application No. CS4-069703CL@2, subject to existing rights and the provisions listed above.

YOUR RIGHT TO APPEAL

You have a right to appeal this Decision to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Decision. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do all of the following within 30 days of the date of receipt of this Decision:

- File your appeal and a copy of this Decision with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Decision on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey WA 98503	Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia WA 98504-7608
Pollution Control Hearings Board 1111 Israel Road SW, Suite 301 Tumwater WA 98501	Pollution Control Hearings Board PO Box 40903 Olympia WA 98504-0903

For additional information visit the Environmental Hearings Office Website: <http://www.eho.wa.gov> .
To find laws and agency rules visit the Washington State Legislature Website: <http://www1.leg.wa.gov/CodeReviser> .

Signed at Yakima, Washington, this _____ day of _____, 2014.

Mark Kemner, LHG, Section Manager
Water Resources Program/CRO

If you need this document in a format for the visually impaired, call the Water Resources Program at 509-575-2490. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

BACKGROUND

Description and Purpose of Proposed Change

On May 23, 2008, Betty Tyler submitted to Ecology an *Application for Change/Transfer of Water Right*. The application was accepted and assigned the identifier Water Right Change Application No. CS4-069703CL@2. In the application, Ms. Tyler proposes a change from a point of diversion (POD) to a point of withdrawal (POW) that is constructed on Ms. Tyler's property (Chelan Co. Parcel No. 252010440100). Ms. Tyler has used the Detwiler, Hanan, Knapp Ditch, locally known as the "Hanan – Detwiler Ditch" (H-D Ditch), to divert her asserted portion of Claim No. 069703. Ms. Tyler proposes to cease all diversions from the H-D Ditch and withdrawal all irrigation water from the proposed well.

The proposed change in POD to a POW is part of the "Knapp-Wham Hanan-Detwiler Irrigation System Consolidation" project. As stated in the application, "The objectives of the project include:

- 1) Eliminating the Hanan-Detwiler surface water diversion and associated unlined irrigation ditch to improve instream flow conditions in the lower river, particularly during the late-summer/fall period, and
- 2) Enhancement of the Knapp-Wham (K-W) system and surface water diversion to eliminate low flow [fish] passage issues and provide additional large pool habitat complexity within the lower Entiat River."

Decommissioning the H-D Ditch by moving eleven users to the K-W Ditch and installing POWs for the remaining five users of the H-D Ditch is expected to result in the elimination of ditch losses and increase instream flows for a portion the Entiat River.

The proposed change in POD to POW for Betty Tyler as proposed in Water Right Change Application No. CS4-069703CL@2 is the subject of this report. This report pertains solely to the portion of Claim No. 069703 asserted by Betty Tyler.

Attributes of the Claim and Proposed Change to a Portion of the Claim

Table 1 Summary of Proposed Changes to a Portion of Claim No. 069703

<i>Attributes</i>	<i>Existing</i>	<i>Proposed</i>
Name	Detwiler, Hanan, Knapp Ditch	Betty Tyler
Priority Date / Date of Application for Change	October 19, 1903	May 23, 2008
Instantaneous Quantity	900 cfs	Not stated
Annual Quantity	1,300 ac-ft/yr	Not stated
Source	Entiat River	A Well
Point of Diversion/Withdrawal	POD: Within the NW ¹ / ₄ SE ¹ / ₄ of Section 10, T. 25 N., R 20 E.W.M.	POW: Within SE ¹ / ₄ SE ¹ / ₄ , in Section 10, T. 25 N., R. 20 E.W.M.
Purpose of Use	Irrigation	Irrigation
Period of Use	April through October	No Change
Place of Use	Lands within Sections 13, 14, 15, and 18 all in T. 25 N., R. 21 E.W.M.	0.7 acres of land within SE ¹ / ₄ SE ¹ / ₄ , in Section 10, T. 25 N., R. 20 E.W.M.

Legal Requirements for Proposed Change

The following is a list of requirements that must be met prior to authorizing the proposed change in Change Application No. CS4-069703CL@2.

- **Public Notice**

A public notice was published in “The Wenatchee World” newspaper on December 23 and 30, 2008. No protests or comments were received by Ecology during the 30-day protest period.

- **State Environmental Policy Act (SEPA)**

A water right application is subject to a SEPA threshold determination (i.e., an evaluation whether there are likely to be significant adverse environmental impacts) if any one of the following conditions are met:

- It is a surface water right application for more than 1 cubic-foot per second (cfs), unless that project is for agricultural irrigation, in which case the threshold is increased to 50 cfs¹, so long as that irrigation project will not receive public subsidies.
- It is a groundwater right application for more than 2,250 gallons per minute (gpm).
- It is an application that, in combination with other water right applications for the same project, collectively exceed the amounts above.
- It is a part of a larger proposal that is subject to SEPA for other reasons (e.g., the need to obtain other permits that are not exempt from SEPA).
- It is part of a series of exempt actions that, together, trigger the need to do a threshold determination, as defined under chapter 197-11-305 WAC.

Because this application does not meet any of these conditions, it is categorically exempt from SEPA and a threshold determination is not required.

- **Water Resources Statutes and Case Law**

RCW 90.03.380(1) states that a water right that has been put to beneficial use may be changed. The point of diversion, place of use (POU), and purpose of use may be changed if it would not result in harm or injury to other water rights.

The Washington Supreme Court has held that Ecology, when processing an application for change to a water right, is required to make a tentative determination of extent and validity of the claim or right. This is necessary to establish whether the claim or right is eligible for change. *R.D. Merrill v. PCHB* and *Okanogan Wilderness League v. Town of Twisp*.

The actual extent and validity of a claim can only be determined by a Superior Court in an adjudication. Any tentative determination made on the extent and validity of a claim by Ecology as part of an application for change investigation is not an adjudication of the claim.

INVESTIGATION

Information comprising this investigation was obtained during a site visit conducted on November 20, 2008. Present during the site visit were Ecology representatives Taylor Horne and Kurt Walker and applicant representative Rich Malinowski of Cascadia Conservation District.

Additional information was obtained from:

- Applicable RCW and WAC chapters.
- Conversations with Rich Malinowski of Cascadia Conservation District.
- Ecology records.
- Historical land and aerial photographs.
- Historical maps.
- Ecology’s Geographic Information System (GIS) data.
- Chelan County records.
- USGS streamflow records.
- Documents listed in the References section of this report.

History of Water Use

The H-D Ditch is located in the Entiat River valley in Water Resource Inventory Area (WRIA) 46. The ditch runs from a POD at river-mile five for about three miles paralleling the Entiat River in a southeasterly direction. Water from the H-D Ditch is used to irrigate orchards and turf south of the Entiat River from river-mile four to river-mile one.

¹ Refer to the “Water Quantities” section of this report for a discussion of the actual, rather than claimed, instantaneous quantity of water diverted under Claim No. 069703.

In 1974, in accordance with chapter 90.14 RCW, a representative of the H-D Ditch users submitted to Ecology a claim to 900 cfs, 1,300 acre-feet per year (ac-ft/yr), for the irrigation of 325 acres from April through October from the Entiat River. Claim No. 069703 asserts that water was first put to use on October 19, 1903 from a POD 1,350 feet north and 1,500 feet west from the southeast corner of Section 10, within the NW¼SE¼ of Section 10, T. 25 N., R. 20 E.W.M. This point is approximately 850 feet south and 250 feet east of the currently used H-D Ditch POD. The claimed POU location may have been inaccurately described on the claim form submitted in 1974. The claimed POU includes numerous parcels south of the Entiat River within Sections 13, 14, 15, and 18, all in T. 23 N., R. 21 E.W.M., Chelan County.

The “Notice of Appropriation of Water” No. 6836 dated October 19, 1903 in Chelan County Auditor’s General Records Volume 41, Page 240 states that S. R. Hanan, D. C. Wolf, and Frank E. Knapp:

“...have appropriated nine hundred (900) cubic-feet of water per second of time, the same to be taken out of the Entiat River by ditch, ditches, flumes and other means at a point where the present ditch known as the Detwiler and Hanna [sic] Ditch is now taken out of the Entiat River, said point being near the north-west corner of the southeast corner of Section 10, Township 25, North of Range 20 E.W.M., which ditch runs and has been constructed in a southeasterly direction running across the south-east quarter of section 10, and a portion of the north-east quarter of the north east quarter of Section 15 and crossing Section 14 and 13 in Township 25, North of Range 20, E.W.M. and ending on the north-west quarter of the south-west quarter of Section 19, Township 25, North of Range 21 E.W.M. Chelan County, State of Washington. Said water is [sic] appropriated for irrigation, stock and domestic purposes, and for mining and milling purposes and for the purposes of creating power. Notice is further given that said ditch was constructed by the undersigned and by their grantors and said water has been diverted and used upon the land belonging to the undersigned and their grantors since 1894, and has become appurtenant to said land.”

A separate “Agreement” document dated May 9, 1906, defines the shares of each member of the “Detwiler & Hannan irrigation ditch” as “S. R. Hannan 2/9; D. C. Wolf 2/9; Frank Knapp 5/9”. The “Agreement” also specifies that each user is responsible to maintain a portion of the ditch proportionate to each user’s share.

A review of aerial photographs from 1945, 1962, 1979, 1998, 2004, 2005, and 2006 indicates that approximately 184.5 acres of irrigation has occurred within the POU during each of those years. A detailed discussion of each user’s historic irrigation practices is included in the “Hanan-Detwiler Ditch Users” section of this report.

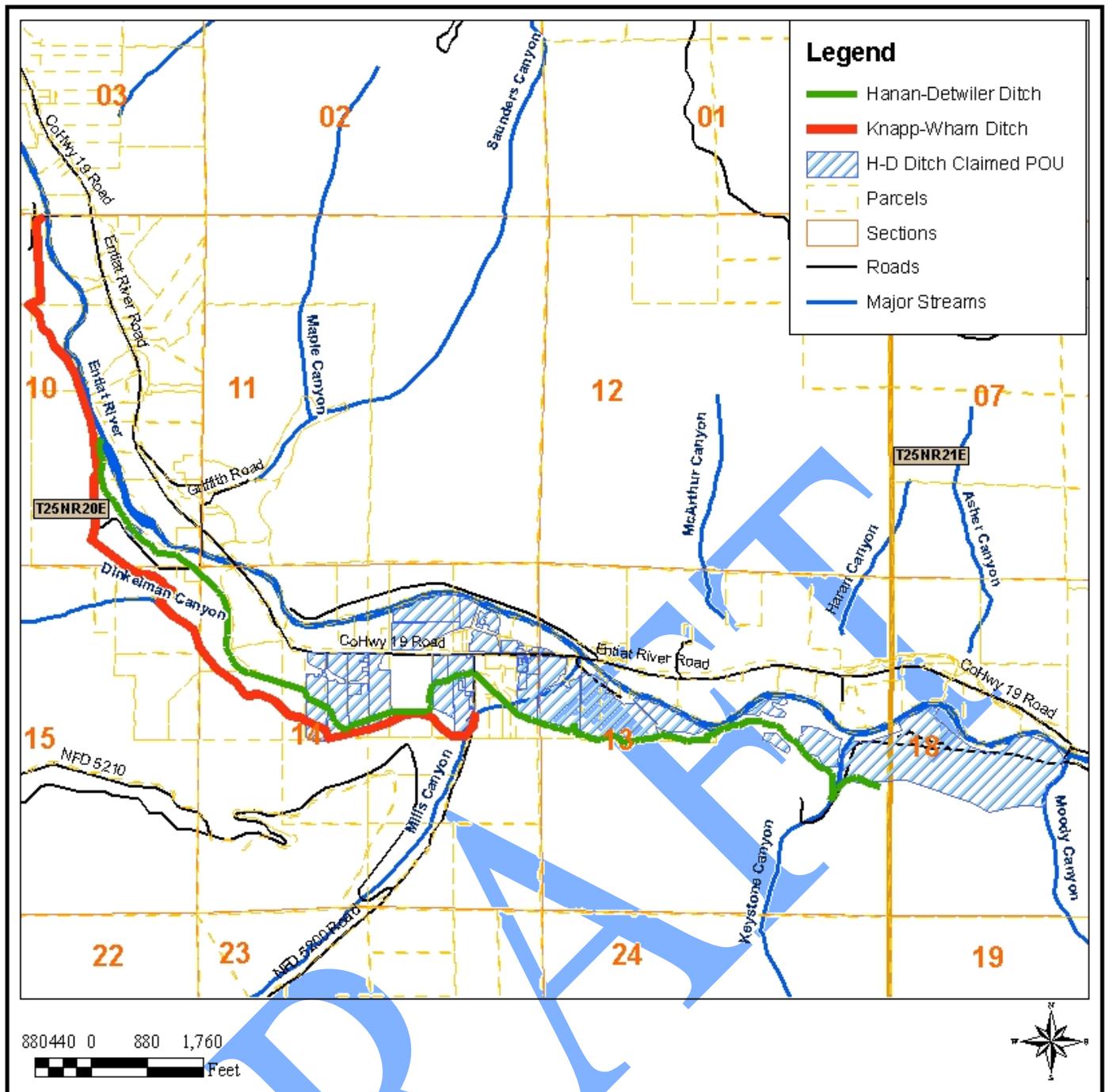


Figure 1 H-D Ditch and K-W Ditch Locations and H-D Ditch Claimed Place of Use

Hanan-Detwiler Ditch Description

A rock weir is constructed from the west bank of the Entiat River to convey water flow into a side channel at approximately Entiat River mile five. The H-D Ditch POD headworks are immediately downstream of a wooden bifurcation structure that splits side channel flows between the bypass side channel and the H-D Ditch. The approximately 1700-foot long bypass side channel functions to dampen canal flow and provide fish habitat. A rotary drum fish screen is installed at the H-D Ditch headworks along with a fish bypass that discharges directly to the bypass side channel (Reclamation 2006).

The H-D Ditch is approximately three miles long, running in a southeasterly direction for the first mile and turning eastward for the remaining length. The H-D Ditch is predominately an open, unlined earthen ditch; several short piped sections exist where the ditch crosses roads and traverses residential parcels. There are sixteen users that have historically used water from the H-D Ditch, listed in the “Hanan–Detwiler Ditch Users” section of this report. The H-D Ditch crosses multiple parcels owned by both ditch users and non-users, terminating on the Keystone Ranch, owned by Gale and Dale Foreman. Excess water is released into a spillway that crosses the Keystone Ranch (Chelan Co. Parcel No. 252118230050) and converges with the Entiat River at approximate river mile 1.5, in the NW¼ of the SE¼ of Section 18, T. 25 N., R. 21 E.W.M.

At a point approximately 1.6 miles down the H-D Ditch on the Summerfield property (Chelan Co. Parcel No. 252014130050), a natural spring named Crystal Spring enters the ditch. Flow monitoring during the 2008 irrigation season indicated that flow into the H-D Ditch varies, ranging from approximately 1.1 cfs in mid-April to 0.5 cfs in July to no flow in October (CCD 2008). Crystal Spring has historically contributed to flows in the H-D Ditch since construction, and the flows are released into the Entiat River along with excess water from the H-D Ditch. Crystal Spring is not claimed as a source of water on Claim No. 069703.

Proposed Point of Withdrawal

A change from a POD to a POW is proposed by Betty Tyler in Change Application No. CS4-069703CL@2. The proposed POW is located 550 feet North and 1,090 feet West of the Southeast corner of Section 10, within the SE $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 10, T. 25 N., R. 20 E.W.M. Well drilling was completed on August 14, 2008. The 4-inch diameter well (Well ID No. AEG326) was completed to the depth of 53 feet below ground surface (bgs), with a welded casing to a depth of 33 feet bgs and screened from 33 to 47 feet bgs. A Berkeley 1 hp submersible pump is installed. The meter installed is a SeaMetrics full pipe magnetic AG-2000 meter. The well is currently connected to Ms. Tyler's irrigation system and supplies all the irrigation water used on the parcel.

Measuring and Reporting Water Use

RCW 90.44.450 states that Ecology may require that withdrawals of groundwater to be metered or measured. It must be constructed and maintained to permit accurate measurement and practical regulation of the flow of water withdrawn. Technical requirements for the measuring and reporting of water use are described in chapter 173-173 WAC. If approved, this decision would contain provisions requiring the measuring and reporting of the quantities of water withdrawn from the well.

Hanan-Detwiler Ditch Users

There are sixteen users on the system that have historically used water from the H-D Ditch. A tentative determination of all historical water use asserted under Claim No. 069703 is a required part of this investigation. The history of water use and the quantity of water put to beneficial use on each H-D Ditch user's land is identified in the following section.

Eleven of the sixteen H-D Ditch users propose a change in POD to the K-W Ditch POD for a portion of Claim No. 069703. In the section below, approximate acres irrigated by the H-D Ditch are asserted under Claim No. 069703; those acres irrigated by the K-W Ditch are asserted under Claim No. 300062:

Conrad Petersen

Mr. Petersen uses water from both the H-D Ditch and the K-W Ditch to irrigate approximately 9.3 acres of pears (Chelan Co. Parcel No. 252014240150). The Petersen irrigation system is set up so that water from both ditches can be used throughout the property. Evidence suggests that the lands down-gradient of the H-D Ditch were historically served by that ditch, while lands up-gradient were served by the K-W Ditch. Approximately 4.8 acres of pear orchard are down-gradient of the H-D Ditch, leaving approximately 4.5 acres irrigated by the K-W Ditch.

The H-D Ditch turnout consists of a five horsepower (hp) Sterling electric motor with a Pacific pump. Mr. Petersen operates irrigation cycles seven days a week with 12 hour sets. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Belvin Gollaher

Mr. Gollaher historically has used water from the K-W Ditch and the H-D Ditch to irrigate approximately 8.8 acres of orchard on his parcel (Chelan Co. Parcel No. 252014240100). Historical evidence suggests that the lands down-gradient of the H-D Ditch were historically served by that ditch, while lands up-gradient were served by the K-W Ditch. Approximately 7.2 acres of orchard are down-gradient of the H-D Ditch, leaving approximately 1.6 acres irrigated by the K-W Ditch.

A Quit Claim Deed for the parcel dated August 28, 2006, listing the Grantor as Entiat Valley Orchards and the Grantee as Gollaher Family, LLC, references "a one-thirtieth share and interest in the Knapp-Wham Irrigation Ditch, subject to the proportionate annual maintenance fees and other conditions of said water right; together with an undivided one-seventy-second share and interest in the Detweller-Hannan Irrigation Ditch and water right." The reference to the two ditches in the Quit Claim Deed suggests that water from both the K-W Ditch and the H-D Ditch has been beneficially used on the orchard land.

The H-D Ditch turnout consisted of a 7.5 hp Baldor electric motor and pump. Recently, Mr. Gollaher has upgraded his irrigation system and began diverting water from the K-W Ditch. Five-days a week, 12 hour sets are used to irrigate. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Martin Petersen

Mr. Petersen uses water from both the H-D Ditch and the K-W Ditch to irrigate approximately 7.9 acres of orchard on the parcel (Chelan Co. Parcel No. 252014240050). The Petersen irrigation system is set up so that water from both ditches can be used throughout the property. The H-D Ditch turnout consists of a 15 hp motor and pump. Seven days a week, 12 hour irrigation sets are used. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Lance Hansen

Mr. Hansen historically has used water from the H-D Ditch to irrigate approximately 7.6 acres of orchard on his parcel (Chelan Co. Parcel No. 252014130200). Recently, he has modified his irrigation system to divert water solely from the K-W Ditch. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Phil Harrison

Mr. Harrison historically used water from both the H-D Ditch and the K-W Ditch to irrigate his parcels (Chelan Co. Parcel Nos. 252014120050 and 252014110060). Recently Mr. Harrison modified his irrigation system to divert water solely from the K-W Ditch. A signed statement from Conrad Petersen, owner of the parcel until 2005 and current manager of the orchard, indicates that the Harrison parcel was originally part of the Frank Knapp homestead:

“The Knapp Homestead cleared the parcel in 1906 to provide pasture for its stock (cattle, sheep and horses) operation. This prompted irrigation of the property using impact sprinklers. The clearing left islands of trees in the pasture to provide shade to the animals. In 1906 there were several apple trees planted on the upstream side of the property that did not fair well due to amount of sand in the soil. The pasture transitioned into the Kellogg Mill Pond in 1914 and continued to operate as the mill pond until 1915. I have provided a historic photo depicting the cleared area and the Mill Dam. In 1921 Frank Knapp passed and the property was sold to Davenport Realtors. I purchased the property in 1975 and planted 14 pear trees which are depicted in the attached picture. The property has since been actively planted with pear trees.”

Historical aerial photographs taken in 1945, 1962, and 1979 show what appear to be a mixture of vegetative cover and uncovered land. It is possible these photos depict the pasture and “islands of trees” mentioned in Conrad Petersen’s statement. Historical aerial photographs taken in 1998, 2004, 2005, and 2006 indicate the parcel was planted with rows of orchard. The apparent irrigated lands on the Harrison property include approximately 15.9 acres of orchard and 2.3 acres of turf.

Susan Summerfield

An April 6, 2009 affidavit signed by Michael Summerfield asserts that water from the H-D Ditch has historically been used to irrigate approximately 7.5 acres of orchard and approximately 6.6 acres of pasture and turf on the Summerfield parcel (Parcel No. 252014130050):

“The following letter is to clarify your questions regarding my 18.5 acre Parcel (252014130050). The Knapp Homestead cleared the parcel in 1906 to provide pasture for its stock (cattle, sheep and horses) operation. This prompted irrigation of the property using impact sprinklers and small trenches. The Hannan-Detwiler Ditch was used for irrigation of the fields. The fields above the ditch were provided water through the use of RAM Pumps, a type of suction pump that initiated flow. Several of the long-time landowners in the valley will attest to this method of irrigation.”

Historical aerial photography suggests irrigation of orchard and turf occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Ronald Mullek

Mr. Mullek has historically used water from the H-D Ditch to irrigate approximately 1.8 acres of turf on his parcel (Chelan Co. Parcel No. 252014110070). Mr. Mullek shares a turnout from the H-D Ditch with Mr. Harris, consisting of a three hp Century motor and pump. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Ed Harris

Mr. Harris has historically used water from the H-D Ditch to irrigate approximately three acres of orchard on his parcel (Chelan Co. Parcel No. 252014110200). Mr. Harris shares a turnout with Mr. Mullek. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Peter Dauer

Mr. Dauer historically has used water from the H-D Ditch to irrigate approximately 0.7 acres of turf on his parcel (Chelan Co. Parcel No. 252014140105). Mr. Dauer, Mr. Peter, Mr. Bill Small, and Ms. Banks share the same turnout from the H-D Ditch, consisting of a 10 hp motor and pump. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Joseph Peter

Mr. Peter has historically used water from the H-D Ditch to irrigate approximately 1.2 acres of turf on his parcel (Chelan Co. Parcel No. 252014110250). Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

A Warranty Deed for the parcel dated August 20, 1963 contains language regarding the use of H-D Ditch water on the parcel: “TOGETHER with five-sixteenths of one share in the Knapp-Hannan Irrigation Ditch, reserving to grantors the right to use of existing pipeline across sold premises (not exclusive) for the carrying of one-eighth of one share of water for irrigation purposes of other lands of grantors for which grantors are to pay their pro rata share of all costs of maintenance of said pipeline, repair or replacement of the same.” The “Knapp-Hannan Irrigation Ditch” is another name by which historical documents reference the H-D Ditch. The Warranty Deed language suggests that water from the H-D Ditch has been beneficially used on the parcel.

Tanya Banks

Ms. Banks has historically used water from the H-D Ditch to irrigate approximately 0.5 acres of turf on her parcels (Chelan Co. Parcel Nos. 252013220100 and 252014110300). Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Five of the sixteen H-D Ditch users have submitted separate applications for change to Ecology, each proposing to change from the H-D Ditch POD to POWs, as described below. Betty Tyler’s Change Application No. CS4-069703CL@2, the subject of this report, is a part of this group. The four additional applications for change are the subjects of separate reports of examination.

Betty Tyler

Ms. Tyler has historically used H-D Ditch water for the irrigation of approximately 0.7 acres of turf on her property (Chelan Co. Parcel No.252010440100). Aerial photography suggests turf irrigation around the residence on the parcel.

Small Brothers Orchards, Inc.

Small Brothers Orchards Inc., represented by Jim Small, has historically used water from the H-D Ditch to irrigate approximately 23 acres of orchard on three parcels (Chelan Co. Parcel Nos.252013230150, 252013230100, and 252013240100). In Change Application No. CS4-069703CL@1, Small Brothers Orchards, Inc. proposes changing from the H-D Ditch POD to two wells on the Small Brothers Orchards, Inc. land, eliminating all diversions from the H-D Ditch.

Michael Grubbs

Mr. Grubbs has historically used H-D Ditch water to irrigate approximately 13.6 acres of orchard on his property (Chelan Co. Parcel No.252013230200). In Change Application No. CS4-069703CL@3, Mr. Grubbs proposes changing from the H-D Ditch POD to a well on his parcel, eliminating all diversions from the H-D Ditch.

Keystone Ranch

Keystone Ranch, represented by Gail and Dale Foreman, has historically used H-D Ditch water to irrigate approximately 73.9 acres of orchard on the property (Chelan Co. Parcel No.252118230050). In Change Application No. CS4-069703CL@4, Keystone Ranch proposes changing from the H-D Ditch POD to an existing downstream POD and two wells in the orchard, eliminating all diversions from the H-D Ditch POD.

William Small

Mr. Small has historically used H-D Ditch water to irrigate approximately 6.3 acres of orchard on his farm (Chelan Co. Parcel Nos.252014140100, 252014140115, and 252014140110). In Change Application No. CS4-069703CL@5, Mr. Small proposes changing from the H-D Ditch to a well to eliminate all diversions from the H-D Ditch POD and allowing Mr. Small to withdraw water for irrigation purposes from the well.

Proposed Use

Claim No. 069703 asserts a water right used for irrigation purposes. The Notice of Appropriation dated October 19, 1903 states the water is used for “irrigation, stock and domestic purposes, and for mining and milling purposes and for the purpose of creating power.” The site investigation and conversations with applicants indicate that over recent history water has been used for irrigation purposes exclusively. No power generating facilities exist within the place of use, nor do any of the users conduct mining, milling, or stockwatering with the water purveyed by the H-D Ditch. All residences within the place of use withdraw domestic water from wells, rather than the H-D Ditch. No change in purpose of use is proposed in Change Application No. CS4-069703CL@2.

Reasonable Use and Efficiency

The Washington State Supreme Court in *Ecology v. Grimes* has previously ruled on “reasonable” use of water. The question of reasonable use of water is germane to this application as the request is to change from a historic and relatively inefficient irrigation system to a new, far more efficient irrigation system. For example, the amounts of water reasonable for irrigating lands by way of an unlined earthen ditch and flood irrigation are greater than the amounts of water reasonably necessary for irrigating lands by pumping water through an enclosed pipe and then distributing it on the field with a center pivot sprinkler system. The use of water in

excess of what is reasonable for the proposed beneficial use would constitute waste, which is prohibited by chapter 90.03.005 RCW.

During the late 19th century, lands were first irrigated in the Entiat River basin through the use of gravity-fed irrigation systems. Flood and rill irrigation were the primary methods of on-farm irrigation during this time period. As the availability of electricity spread in the 20th century, an increasing number of electric pumps were used to provide irrigation water. Today, the customary form of on-farm irrigation in the Entiat River consists of electric pumps delivering water to a combination of under-tree or over-tree impact sprinklers, or micro-spray undertree sprinklers. During the site visit, the applicants' were observed using a combination of these types of on-farm irrigation systems. The age of applicants' irrigation systems varies, depending on how recently new fruit trees were planted and irrigation upgrades occurred. Ecology Water Resources Guidance 1210 lists the range of efficiencies for the irrigation systems used by the applicants. A discussion of on-farm irrigation efficiency is included in the Annual Quantity (Qa) section of this report.

Water Quantities

No records of the Qa or instantaneous quantity (Qi) of water diverted are available for the H-D Ditch POD. Additionally, turnouts from the H-D Ditch have never been metered; therefore, there is limited historical record of the instantaneous or annual quantities of water beneficially used by individual users.

The H-D Ditch is physically incapable of diverting the instantaneous diversion rate of 900 cfs as asserted by Claim No. 069703 and the 1903 Notice of Appropriation of Water. Flow measurements taken at Ardinvoir (USGS Gauge No. 12452800) indicate that flows in the Entiat River at the H-D Ditch POD do not exceed 900 cfs for a portion of the irrigation season.

As part of the change investigation process, a tentative determination of the extent and validity of the entire claim must be conducted to ensure the water right is not enlarged by the proposed change.² First, the instantaneous quantity and the annual quantity of water diverted under the entire claim must be established; these are the total water quantities used by all users of the H-D Ditch. Then, the instantaneous and annual quantities for the portion of Claim No. 069703 asserted by Betty Tyler must be identified; these are the water quantities proposed for change in Change Application No. CS4-069703CL@2 - the subject of this report. Lastly, the remaining quantities of water must be identified that are appurtenant to the parcels owned by the H-D Ditch users that propose changing to a different POD – proposed in Change Application No. CS4-069703CL – and the H-D Ditch users that propose changing to POWs – proposed in Change Application Nos. CS4-069703CL@1 through @5. The findings of change investigations for each application will be the subject of separate reports.

Instantaneous Quantity (Qi)

Several studies were conducted on the H-D Ditch during the design of the project:

- *2003 Entiat River Gain Loss Study* – Measurements were conducted on September 25-28, 2002, at various locations on the Entiat River and the Mad River, a tributary of the Entiat River. The objective of the study was to determine the surface water contributions and losses to the mainstems of both rivers and to identify reaches where surface water/groundwater interchanges were taking place. A measurement taken at the H-D Ditch POD indicated that 2.51 cfs was diverted; a measurement of the H-D Ditch fish bypass indicated that 0.29 cfs was used for bypass flow. Diversions into the H-D Ditch system were calculated as 2.22 cfs at the time of measurement.
- *2006 Predesign Memorandum* – In September 2006, the United States Bureau of Reclamation released a Predesign Memorandum for the Knapp-Wham/Hanan-Detwiler Consolidation Project. As part of that memorandum, the total amount of water turned out from the H-D Ditch system was calculated at 3.36 cfs, based on acreage and use. It is not clear in the memorandum whether this calculation was based on physical gauging or a paper calculation using water duty and irrigated acreage. Two “system measurements” are included in the report; however, the H-D POD diversion rate was not measured.
- *2008 Cascadia Conservation District (CCD) data* – CCD Field staff conducted several measurements of the H-D Ditch throughout the 2008 irrigation season to estimate ditch losses due to in-ground seepage. During the five measurements all turnouts from the H-D Ditch were stopped. Ditch flow at H-D Ditch fish screen was recorded during each measurement; flows varied throughout the season between a low of 1.41 cfs and a high of 2.09 cfs.

At the time of the 2008 H-D Ditch measurement, several of the H-D Ditch users had modified their irrigation systems and begun diverting water solely from the K-W Ditch. In effect, these users (Conrad Petersen, Mark Petersen, Belvin Gollaher, and Michael Hansen) conducted unauthorized, or *de facto*, changes from the H-D Ditch POD to the K-W Ditch POD. The 2008 H-D Ditch measurements may not have indicated the maximum rate of instantaneous diversion because these four users were irrigating their combined 26.7 acres of orchard with water diverted at the K-W Ditch POD. Irrigation is defined in statute as a beneficial use of water (RCW 90.54.020(1)).

² RCW 90.03.380; *Okanogan Wilderness v. Town of Twisp*, 133 Wn.2d 769, 947 P.2d 732 (1997); *R.D. Merrill Co. v. Pollution Bd.*, 137 Wn.2d 118, 969 P.2d 459 (1999).

Ecology Water Resources Program Policy No. 1120 states that in situations where *de facto* water right changes have occurred Ecology considers whether the unauthorized use of water is considered a beneficial use of water. The tentative determination of the validity and extent of a water right may find the portion, or entirety, of a right put to unauthorized use eligible for change if the water has been put to beneficial use, and other statutory requirements have been fulfilled.

The H-D Ditch flow data listed above does not adequately represent the total maximum instantaneous rate of diversion of the H-D Ditch; flow data was not continuously collected over multiple irrigation seasons and several users have conducted *de facto* changes in POD. Thus, the measurements of the instantaneous rate of diversion of the H-D Ditch POD are likely lower than the historically established instantaneous rate of diversion.

Based on historical data listed above and an evaluation of customary irrigation practices in the Entiat River valley³, a reasonable maximum Qi at the H-D POD is 4.1 cfs; this is an estimate of the maximum instantaneous diversion of water during peak irrigation season based on the total irrigated acreage and crop type irrigated by the users of the H-D Ditch. The 4.1 cfs Qi corresponds to an instantaneous water duty of 10 gallons per minute per acre.

For this investigation, it is necessary to quantify the Qi each user has historically put to beneficial use, to ensure the future use will not exceed the historical use. Proportionally dividing the maximum Qi based on the two user groups, based on irrigated acreage, results in use of 1.49 cfs by the eleven users proposing to change to the K-W POD and 2.61 cfs by the proposed POW users. Each asserted portion of the claim consists of annual and instantaneous quantities.

The proposal by Betty Tyler to change to a POW asserts interest in a portion of Claim No. 069703 that corresponds to the quantity of water historically used to irrigate 0.7 acres of turf. No proposed annual and instantaneous quantities were specified in Change Application No. 069703CL@2. Using a calculation of the instantaneous water duty of 10 gallons per minute per acre, 7 gpm is a reasonable calculation of the Qi for 0.7 acres of irrigation.

Annual Quantity (Qa)

Part of this investigation includes quantifying the historical annual beneficial use of the water right proposed for change. In the absence of water meter records, an investigator may use aerial photographs, irrigation system capacity, and crop irrigation requirements (CIRs) to make a tentative determination of beneficial use of the water right, based on types of activities for which the water was used and limited by reasonable use of water.⁴ Amid a dearth of reliable water pumping data, CIR data from chapter 173-546 WAC is often used to make a tentative determination of the annual quantity of water used. The per-acre CIR for fruit trees in the Entiat region is 37.27 acre-inches per year, or 3.11 ac-ft/yr; the CIR for turf grass is 31.68 acre-inches per year, or 2.64 ac-ft/yr.

All sixteen historic H-D Ditch users irrigate a total of approximately 170.7 acres of orchard and 13.8 acres of turf, a total of 184.5 acres of irrigation. Solid-set undertree and overtree sprinklers predominantly are used to irrigate the parcels. A 65-percent application efficiency rate is reasonable based on the age and condition of this type of irrigation system, and this rate is included in the calculation of the total irrigation requirement (TIR). The TIR for the orchard is calculated by dividing the CIR by the 65-percent application efficiency of the irrigation systems. The TIR for the H-D Ditch orchards calculates to be 4.78 acre-feet per acre, or 815.9 ac-ft/yr for 170.7 acres of orchard. The TIR for the turf calculates to be 4.06 acre-feet per acre, or 56.0 ac-ft/yr for 13.8 acres of turf. The total TIR for the sixteen H-D Ditch users sums to be 872 ac-ft/yr (acreage and Qa quantities are rounded up to one decimal place to represent a practically measureable quantity).

The following tables show the historical beneficial use of water among the H-D users; Table 2 shows the eleven users that propose changing to the K-W POD (the subject of the investigation for Change Application No. CS4-069703CL) and Table 3 shows the five users that propose changing to separate POWs, including Betty Tyler, and a total of all irrigation under Claim No. 069703.

Table 2: H-D POD to K-W POD Changes

<i>H-D User</i>	<i>Crop</i>	<i>Acres</i>	<i>TIR (ac-ft/yr)</i>	<i>Qi (cfs)</i>
Banks	Turf	0.5	2.0	*
Conrad Petersen	Orchard	4.8	22.9	*
Dauer	Turf	0.7	2.8	*
Gollaher Family	Orchard	7.2	34.4	*
Hansen	Orchard	7.6	36.3	*

³ Described in the Reasonable Use and Efficiency section of this report.

⁴ Ecology Water Resource Program Policies 1210, 1120, and 1200; see Ecology v. Grimes, 121 Wn.2d 459, 852 P.2d 1044 (1993)

Table 2: H-D POD to K-W POD Changes – Continued

<i>H-D User</i>	<i>Crop</i>	<i>Acres</i>	<i>TIR (ac-ft/yr)</i>	<i>Qi (cfs)</i>
Harris	Orchard	3.0	14.3	*
Harrison	Orchard	15.9	76.0	*
	Turf	2.3	9.3	*
Martin Petersen	Orchard	7.9	37.8	*
Mullek	Turf	1.8	7.3	*
Peter	Turf	1.2	4.9	*
Summerfield	Orchard	7.5	35.9	*
	Turf	6.6	26.8	*
Sum		67.0	310.8	1.49 cfs⁵

Table 3: H-D POD to POW Changes

<i>H-D User</i>	<i>Crop</i>	<i>Acres</i>	<i>TIR (ac-ft/yr)</i>	<i>Qi⁶ (gpm)</i>
Michael Grubbs	Orchard	13.6	65.0	133
Keystone Ranch ⁷	Orchard	73.9	353.2	700
Small Bros Orchards, Inc.	Orchard	23.0	109.9	216
William Small	Orchard	6.3	30.1	63
Tyler	Turf	0.7	2.8	7
Sum		117.5	561.1	1156.4 gpm
Table 2 & 3 Sum⁸		184.5	872	4.07 cfs

An annual quantity of water proposed for change was not identified in Change Application No. CS4-069703CL@2. As part of this investigation, a calculation was conducted based on estimates of historic beneficial use of water for 0.7 acres of turf irrigation. Using the CIR and irrigation efficiency parameters described above, a reasonable TIR is 2.8 ac-ft/yr for the Betty Tyler property.

Development Scheduling

The POW is currently connected to Ms. Tyler’s irrigation and used to irrigate her lawn.

The H-D Ditch has not been operated from the 2010 irrigation season onward. The development schedule listed on the first page of this report accommodates the planned construction schedule.

Other Rights Appurtenant to the Place of Use

One claim appears to be appurtenant to the place of use of Betty Tyler’s portion of Claim No. 069703.

WRC 099214 – Stella Bryan

In 1974, Stella Bryan submitted a claim to Ecology asserting a groundwater right for 3 gpm, 2 ac-ft/yr, from a well located within SE¼SE¼ of Section 10, T. 25 N., R. 20 E.W.M. for domestic supply. The claimed date of first putting water to use is July 1944. The claimed POW is located within the SE¼SE¼ of Section 10, T. 25 N., R. 20 E.W.M. This claim is likely associated with water supply for Ms. Tyler’s home.

Hydrologic/Hydrogeologic Evaluation

The following are excerpts from a technical memorandum titled “*Hydrogeologic Technical Analysis for Water Right Change Application Nos. CS4-069703CL@1, CS4-069703CL@2, CS4-069703CL@3, CS4-069703CL@4, and CS4-069703CL@5, Chelan County, Washington*” written by Kurt Walker and

⁵ Table 2 – The eleven H-D Ditch users propose combining the diversions to the K-W Ditch POD. If approved, Ecology would likely regulate the instantaneous rate of diversion for all eleven users at the K-W Ditch POD, rather than each user’s turnout from the K-W Ditch.

⁶ Table 3 - The specific instantaneous withdrawal rates (Qi) proposed in Change Application No. CS4-069703CL@1 through @5 are used when they do not exceed the historic average water duty of 10 gallons per minute per acre. If approved, the change authorizations for POWs would likely be in gallons per minute, following the convention for groundwater withdrawals.

⁷ Change Application No. CS4-069703CL@4 was amended to propose a change to two POWs and a POD.

⁸ Table 3 - Acreage and Qi quantities are rounded up to one decimal place to represent a measurable quantity.

reviewed by Thomas Mackie. The full technical memorandum is available at Ecology's Central Regional Office in Yakima:

Site Geology near the Subject Wells

The site specific geology description is based on geologic mapping (Tabor et al., 2007), well logs, topographic maps, air photos, and site observations. The metamorphic Chelan Mountain terrane and the granitic Entiat pluton form the bedrock floor in the Entiat River Valley from roughly river-mile 7 to the confluence with the Columbia River. The subject area (river-miles 2-5) is located along the right bank (looking downstream) of the Entiat River. With the exception of the Betty Tyler well, the subject wells are drilled to bedrock then completed into the unconsolidated fluvial valley fill sediments. The project well logs record that boulders, cobbles, gravel, and sand were encountered with the sands and gravels comprising the majority of the material. The thickness of the unconsolidated valley sediments varies with the topography of the underlying bedrock, but is generally less than 80 feet. The Betty Tyler well was drilled to 47 feet below ground surface (bgs) without encountering bedrock, however the other project wells contacted bedrock between 38 and 79 feet bgs.

Well Location and Summary:

Didricksen (2008), well logs, and other application documents were used to summarize the well and pump characteristics (see Table 2.) The project wells were drilled and tested between May and August of 2008. Each of the wells were drilled to bedrock (except the Betty Tyler well), constructed with an 8-inch casing, and completed into the valley fill aquifer. Ten-foot long 80-slot stainless steel screens were placed near the bottom of the wells after which they were developed and tested using a step draw-down method. Well performance information, provided by the applicant, was used to better understand the aquifer characteristics and select the most appropriate pump for each location. While the Keystone 1 well does not currently have a pump installed and the Betty Tyler well has a 1 horsepower (hp) submersible pump, the remaining wells are outfitted with 7.5 hp submersible pumps capable of delivering approximately 100 gpm at 200 feet of head.

Betty Tyler Well

The Betty Tyler well was not drilled to bedrock, but produced 30 gpm at the time of drilling. A 1 hp submersible pump was installed which is able to withdraw 20 gpm which is more than adequate to meet the irrigation requirement of the Tyler lands (0.64 acres.)

Potential for Impairment of Ground Water Users:

An evaluation of well logs, aerial photographs, and personal communications were used to identify wells near the project wells which may experience composite drawdown as a result of this change. The Keystone 1 and 2, Small Brothers 1 and 2, and Betty Tyler well are located much closer to the Entiat River than any identified non-project wells. Proximity of these project wells to the River, aquifer characteristics, and hydraulic communication between the valley fill aquifer and the Entiat River will likely limit potential interference with other wells in the area. Because the project wells are located so close to the Entiat River, their pumping drawdown cone is expected to encounter a recharge boundary and stabilize before it extends out to any identified non-project wells. This is not the case for the remaining project wells.

Three domestic wells are located within 300 feet of the William Small well, and the Michael Grubbs well is located approximately 280 feet from a different domestic well. Property owners Joseph Peter, Peter Dauer, and Tanya Banks have domestic wells near the William Small project well. While only the Dauer well has an associated well log which confirms that it is completed in the subject aquifer, the Peter and Banks wells are assumed to be completed into the subject aquifer and not into bedrock for evaluation purposes. Using GPS coordinates, air photos, and personal communication, the domestic wells are approximately 315 feet (Peter), 190 feet (Dauer), and 130 feet (Banks) away from the William Small well. Property owner Daniel Benefield uses a well that is located within the Small Bros Orchard property and is approximately 280 feet away from the Michael Grubbs well. Since there is no log for the Benefield well, it will likewise be assumed to be completed into the subject aquifer for evaluation purposes.

An evaluation using the Theis non-equilibrium equation coupled with image well theory and estimated aquifer parameters discussed above was performed to assess possible pumping interference at the nearby domestic wells as a result of the change. The evaluation was based on scenario in which the project well was pumped at the maximum Q_i for 60 days. After 60 days of pumping, the drawdown cone is expected to have reached the River and stabilized. Results indicate (see Table 3) that pumping at the maximum authorized Q_i is unlikely to draw down the water table more than 3 feet at the Benefield well site, and is expected to induce less drawdown at the other well locations. Because pumping at the maximum Q_i would exhaust the Q_a in approximately 110 days, pumping at the maximum Q_i is expected to be used only periodically to meet peak crop demand. As a result, composite drawdown/well interference, which may be observed, is not expected to be significant. Therefore, withdrawals from the proposed wells are not anticipated to result in the impairment of any ground water users (see Appendix A.)

Table 3⁹
Potential for Impact to Domestic Wells

Domestic Well Name	Nearest Project Well	Distance to Project Well (ft)	Estimated Drawdown (ft)
Peter	William Small ¹	315	1.5
Dauer		190	1.6
Banks		130	2.2
Benefield	Michael Grubbs ²	280	2.9

¹ Evaluation based on pumping 61 gpm for 60 days.

² Evaluation based on pumping 133 gpm for 60 days.

Same Source Consideration:

To change from a POD to a POW, the well must be in direct hydraulic continuity with the original surface water source. Direct hydraulic continuity exists when, as a result of pumping the proposed well, additional water from the original surface water source will flow into and recharge the aquifer where it can eventually be captured as ground water. Additionally, the proposed well must be located and constructed such that within a short time after pumping starts, the majority of the pumped water should be derived from, or replaced by, the surface water source; and within a short time after pumping stops, the ground water that has been removed from aquifer storage should be replaced by infiltration from the surface water source. This requirement ensures that the POW can be managed in the same manner as the POD. An analytical model was used to evaluate the hydraulic relationship between the original source of water and the proposed well.

The Well Pumping Depletion Model (WPDM) (Western Water Consulting, 2001) was used to estimate the amount and timing of pumping-induced stream flow depletion from the proposed wells. The rate and timing of stream depletion are dependent on the properties of the subject aquifer and the distance between the pumping well and the stream. In general, the greater the distance between the pumping well and the stream, the greater the time period is between pumping and stream flow impact. The aquifer characteristics and well properties described above were used to define the WPDM parameters.

The maximum pumping rate and a transmissivity of 10,000 gallons per day/foot (gpd/ft) was used to assess the rate and timing of stream depletion of the Entiat River for each of the change applications. The model results are listed below in Table 4. After pumping ceases, stream depletion is expected to decrease by more than 50% within one day near many of the project wells. Stream depletion is predicted to dissipate more slowly in the vicinity of the Grubbs and William Small wells because they are located further away from the Entiat River. While post-pumping effects will continue to impact the River, residual stream depletion is expected to dissipate well before the next irrigation season. As a result, the proposed wells are considered to be in direct hydraulic continuity with the Entiat River, and the proposed wells can be effectively managed in the same manner as the historic POD.

Table 4
Stream Depletion Model Results

Name	Distance to the Entiat R. (ft)	Pumping Rate (gpm)	Days to 50% *Reduction in Stream Depletion
Small Brothers 1	35	216	<1
Small Brothers 2	20	216	<1
Betty Tyler	145	6	3
Michael Grubbs	420	133	10
Keystone 1	35	30	<1
Keystone 2	50	115	<1
William Small	500	61	12

*Reduction in Stream Depletion = pumping rate - amount of continued stream depletion. Results based on Schroeder (1987) with a transmissivity of 10,000 gpd/ft.

Impairment Considerations

RCW 90.03.380 provides that a perfected water right may be changed in several ways, provided that the change will not impair the right of another water right holder. When investigating a change in POD to a POW location, the potential for impairment of surface water and groundwater users in the nearby area must be considered including the potential of impairment of instream flow rights.

⁹ Table 1 and 2 are included in the full text of the technical memorandum.

Impairment may result from an action that:

- adversely impacts the physical availability of water for a beneficial use that is entitled to protection, including earlier filed applications, or
- prevents the beneficial use of the water to which a water right holder is entitled, or
- adversely affects the flow of a surface water course at a time when the flows are at or below instream flow levels established by rule, or
- degrades the quality of a groundwater source such that an existing user of that source is prevented from the beneficial use of water.¹⁰

Instream Flow

The term “instream flow” is used to identify a specific stream flow (typically measured in cubic-feet per second, or cfs) at a specific location for a defined time, and typically following seasonal variations. Instream flows are usually defined as the stream flows needed to protect and preserve instream resources and values, such as fish, wildlife and recreation. Instream flows are most often described and established in a formal legal document, typically an adopted state rule.

Once established, a minimum flow constitutes an appropriation with a priority date as of the effective date of the rule establishing the minimum flow (RCW 90.03.345). Thus, a minimum flow set by rule is an existing right which may not be impaired (RCW 90.03.345; RCW 90.44.030).

Adopted on September 3, 2005, chapter 173-546 WAC established a minimum instream flow for the three stream management units in the Entiat River Basin WRIA 46. Both the historic H-D Ditch POD and proposed POWs are located within the Lower Entiat stream management unit that extends from the confluence of the Entiat and Columbia Rivers to Entiat river-mile 16.2. The October 19, 1903 claimed date of first water use of Claim No. 069703 predates the September 3, 2005 priority date of the minimum instream flow; therefore, the diversion asserted under the claim is not subject to curtailment when minimum instream flow levels are not met.

Existing Water Rights

There is no history of curtailment of water rights due to unavailability of water in the Entiat Basin. As stated in the hydrogeologic technical memorandum, it is anticipated that no impairment to any groundwater users will result from the operation of the Betty Tyler well.

Any diversion asserted under Claim No. 069703 is subject to curtailment based on the priority system, whereby senior rights must be satisfied before a junior right may divert water. In order to preserve the integrity of the priority system if the change in POD to a POW is approved, water use at the POW must be managed in the same manner as the originally claimed POD. If a situation occurs in which the priority system mandates that the diversions under Claim No. 069703 must be curtailed, the asserted withdrawal under the portion of Claim No. 069703 at the newly authorized POW must be curtailed until all senior water rights are fulfilled.

Public Interest Considerations

The addition of a POW to a water right must not have a detrimental effect upon the public interest. A public interest investigation includes analyzing harm to fish and wildlife, effects on endangered or threatened species, impacts to wetlands, recreation, water quality, and any other concerns expressed by commenting and protesting parties.

In general, removing PODs and instream structures from a river has a positive impact on aquatic habitat. Diversions and instream pumps require frequent servicing that involves entering the river to repair structures, remove silt and debris from screens, and maintain pushup dams. Replacing a POD with a POW alleviates the need for repeated construction in the river and the associated disturbances from increased silt loading and streambank modifications.

Fisheries and Habitat Impacts

In a letter to Ecology dated March 4, 2008, Washington Department of Fish and Wildlife (WDFW) Instream Flow Biologist Paul La Riviere describes the impacts and benefits of the proposed change in POD and addition of POWs:

“The project will consolidate two major irrigation systems in the lower Entiat River. Despite an upstream POD move (0.8 miles) the loss of flow in the mainstem will be offset by an increase in flow in

¹⁰ See Water Resource Program Policy 1200 (POL-1200) and chapter 173-150 WAC.

the 1,200-ft side channel, non-consumptive (NCU) water savings in the primary reach (estimate is between two and six cfs for 3.26 miles), and additional instream habitat structures (rock weirs, large woody debris placed along the mainstem and in the side channel) that will improve some habitat and the hydro-geologic conditions of the stream” (Page 2).

“The WDFW Water Team supports the funding of the POD consolidation project provided that the [maintenance of] the side channel habitat features is a long-term priority for the cooperating landowner and project managers. We feel this is essential. [...] Flow restoration and maintenance, especially during the winter period, may be the most productive outcome for fish life of the project. The restoration of floodplain functions by operating and maintaining the H-D side channel as a natural habitat helps to address major deficiencies that were consequences of the 1948 and 1970 stream re-alignment activities” (Page 4).

WDFW identified an additional benefit of the project as the elimination of annual instream POD maintenance and the associated habitat disturbance, resulting in a likely reduction in juvenile fish mortality, redd disturbance, and sediment impacts. WDFW did not identify any adverse impacts to fish rearing or recreational activities associated with the proposed change in POD.

CONCLUSIONS

Based on careful consideration of the information presented in this report, the author makes the following conclusions regarding the proposed changes in Change Application No. CS4-069703CL@2:

- The portion of Claim No. 069703 that has been put to beneficial use by the applicant and is available for change is 7 gpm, 2.8 ac-ft/yr, for the irrigation of approximately 0.7 acres from April 1 through October 31.
- The subject claim will not be enlarged by approving a change in point of diversion. The quantity of water diverted at the authorized POW is limited to the quantity of water historically put to beneficial use, as listed on the cover page of this report.
- The proposed POW withdraws water from the same source of water as the originally claimed POD.
- The proposed changes will not impair existing water rights.

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that the request for change to Betty Tyler’s portion of Claim No. 069703 be approved in the amounts and within the limitations listed below and subject to the provisions beginning on Page 2, et seq.

Purpose of Use and Authorized Quantities

I recommend that 7 gpm, 2.8 ac-ft/yr, for the irrigation of approximately 0.7 acres April 1 through October 31 are available for change to a point of withdrawal. The amount of water recommended is a maximum limit and the water user may only use that amount of water within the specified limit that is reasonable and beneficial.

Point of Withdrawal

A well located approximately 550 feet North and 1,090 feet West of the Southeast corner of Section 10, within the SE $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 10, T. 25 N., R. 20 E.W.M. Ecology well tag No. AEG-326.

Place of Use

0.7 acres of land within the SE $\frac{1}{4}$ SE $\frac{1}{4}$, in Section 10, T. 25 N., R. 20 E.W.M. as further described on Page 1 of this Report of Examination. Chelan Co. Parcel No. 252010440100.

Report by: _____
Dave Holland
Water Resources Program

_____ Date

REFERENCES

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DRAFT

Attachment 1

